The Effect of the Will of the Bedridden Elderly to be Self-Reliant on their Life Prognoses in Japan

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Abstract

The purpose of this study was to establish the relationship between the will of bedridden elderly people to be self-reliant and their life prognosis, and to clarify the factors related to the will to be self-reliant of such persons.

The cohort consisted of 274 bedridden elderly persons aged 65 years and over who lived at home and were observed continually over ten years. Data were obtained from observation records done by four public health nurses who visited the subjects at least once a year and assessed their state of health. The variables studied were demographic variables, activities of daily living, the cause of being bedridden, the strength of the will to be self-reliant and the date of having become bedridden. Cox's proportional hazard model, the Kaplan-Meier method and discriminant analysis were used for statistical analysis.

Of the 274 subjects, 107 subjects (39.1%) were male and 167 (60.9%) female, with a mean age of 82 years. The subjects who lived with their families accounted for 96.7%. The mortality hazard ratio for subjects with a weak will to be self-reliant to those with a strong will was 1.64, which was statistically significant. Discriminant analysis demonstrated that the will to be self-reliant showed a significant relationship with age, level of activities of daily living and refraining from expressing one's own feelings in consideration of the family's feelings.

Bedridden elderly persons with a strong will to be self-reliant had a significantly better life prognosis than those with a weak one. A strong will to be self-reliant among the elderly is related to age, level of activities of daily living, and refraining from expressing one's own feelings in consideration of the family's feelings.

This study clearly points out the need for home care service personnel to work in cooperation with families to emphasize encouragement to build the will to be self-reliant for the elderly in Japan.

Key words: will to be self-reliant, bedridden elderly, life prognosis, survival time, activities of daily living

Introduction

The elderly in Japan seem to depend more on their children compared to their western counterparts. According to statistics, the percentage of the elderly in Japan living with their children is 50% while it is 15% in the United States and Germany and 10% in England¹⁾. Elderly people in Japan seem to depend on their children for financial support, food and shelter. Under these

circumstances, we may conjecture that the independence of a Japanese elderly person is very low.

Bedridden elderly people aged 65 years and over were estimated to account for 3.2% of the population for aged 65 years and over in Japan in 1987 which is about six times the corresponding figure of 0.5% in Europe in 1985²⁾. The idea that people in Japan take it for granted that children will look after their parents seems to have a substantial effect on this difference. This condition serves as a negative incentive for the elderly to strive on their own. From this point the family system in Japan may have a negative effect on the well being of the elderly. For this reason, we carried out a survey to find the relationship between the will of bedridden elderly persons to be self-reliant and their life prognosis, and to clarify the factors related to the will to be self-reliant. By the will to be self-reliant is meant the

Received Oct. 27 1998/Accepted Feb. 1 1999

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individual elderly person's will to try to look after her- or himself.

Subjects and Methods

Health care services for the elderly in the city of Ikeda and our study both started in April 1984. This city has a total population of 101,264, of whom 8,708 were aged 65 years or over in April 1984. The subjects of this study were 274 bedridden elderly persons aged 65 years or over who lived at home. This subjects were all bedridden elderly persons in the city of Ikeda. An assessment of their state of health was made at the time of the first visit by a public health nurse. Data were obtained from observation records by four public health nurses. To obtain data objectively, these public health nurses discussed and agreed on their method of assessment. The variables studied were sex, age, activities of daily living which included eating, using the toilet, dressing, bathing, turning over in bed, sitting and moving, as well as the cause for being bedridden, the number of family members, the care-takers of the elderly, help from their family, refraining from expressing one's own feelings in consideration of the family's feeling (here after referred to as "refraining from expressing one's feelings"), whether the will to be self-reliant was strong or weak, being alone in the daytime and the date of having become bedridden.

For activities of daily living, each variable was scored as 0 (possible without help), 1 (possible with partial help), or 2 (totally dependent on help). Cronbach's alpha of reliability coefficient for the seven variables produced by reliability analysis showed a high value of 0.9365 (standardized alpha=0.9370). The scores for activities of daily living were the total scores for the seven variables. Scores for activities of daily living of the subjects were six points or more. On the basis of the total scores, the subjects were divided into two groups, "high" (6 to 11 points), or "low" (12 to 14 points). To divide the subjects into two groups, the average score (11.2) and the number of subjects in each groups were criterion.

The subjects were also classified into two age groups, 65- 79 years and 80 years or over. The average age for this study was 82 years. The subjects were similarly grouped into two classes according to the period from the date of the subjects having become bedridden to the date of the first visit (the period before the first visit) of less than 31 months and 31 months or more, where the mean period before the first visit was 31.1 months. The will to be self-reliant was given one of two values at the time of the first visit by a public health nurse: "strong" if the subjects tried to perform activities of daily living by themselves; to move by themselves as much as possible, to respond when talked to them and to express their needs and their desires, and "weak" if the subjects did not. For the will to be self-reliant, we carried out our survey one year after the first visit by the public health nurse, and realized a high reproducibility by obtaining the same results from 95.3% of the subjects.

The subjects were observed for eleven years, from April 1984 to March 1995. A public health nurse visited the subjects at least once a year. Deaths were checked every March. By March, 1995, 201 of the 274 subjects(73.4%) had died, 33 subjects (12.0%) had been admitted to hospitals and institutions, six subjects (2.2%) had moved away, and the lives of the remaining 34 subjects (12.4%) had not changed.

The statistical differences were examined with the χ^2 test, Cox's proportional hazard model, the Kaplan-Meier method and

discriminant analysis for the will to be self-reliant. For multivariate analysis, the variables were expressed as follows: the will to be self-reliant (0: strong, 1: weak), sex (0: male, 1: female), age (0: 65-79 years, 1: ≥ 80), level of activities of daily living (0: high, 1: low), number of family members (1: 1 person, 0: ≥ 2), the care-taker of the elderly (1: spouse, 0: other), help from their family (0: no, 1: yes), refraining from expressing one's feelings (0: yes, 1: no), being alone in the daytime (1: yes, 0: no), and the period before the first visit (1: < 31 months, 0: ≥ 31). The Statistical Package for Social Sciences (SPSS) was used for analysis.

Results

1. Characteristics of the subjects and mean survival time for classification groups

Table 1 Comparison of mean survival time (months) of the elderly for groups classified according to baseline data

Variable	(n ¹⁾)	Survival time		Logrank test	
		(months)	(95%CI ²⁾)	Statistic ³⁾	p value
Sex					
Male	(105)	16.5	(11.5, 21.5)	18.3	<0.0001
Female	(156)	33.6	(27.0, 40.2)		
Age (years)					
65-79	(83)	33.2	(24.8, 41.5)	5.5	<0.05
≥ 80	(178)	23.3	(17.9, 28.7)		
Level of activities of daily living					
High ⁴⁾	(128)	32.3	(25.5, 39.1)	9.9	<0.005
Low ⁵⁾	(133)	21.1	(15.2, 27.1)		
Number of family members					
1	(9)	25.4	(12.0, 38.7)	0.4	0.5520
≥ 2	(252)	26.5	(21.8, 31.1)		
Care-taker of the elderly					
Spouse	(82)	22.5	(15.1, 29.9)	2.3	0.1307
Other	(177)	28.7	(23.0, 34.4)		
Help from the family					
Yes	(256)	26.3	(21.8, 30.7)	0.0	0.9955
No	(11)	36.0	(10.0, 61.9)		
Refraining from expressing one's feelings					
Yes	(81)	34.1	(25.1, 43.2)	4.7	<0.05
No	(177)	23.7	(18.3, 29.0)		
Being alone in the daytime					
Yes	(14)	26.9	(22.2, 31.7)	0.4	0.5495
No	(240)	15.5	(7.5, 23.5)		
Will to be self-reliant					
Strong	(92)	37.6	(27.9, 47.2)	10.3	<0.001
Weak	(169)	21.0	(16.4, 25.6)		
Period before the first visit (months)					
< 31	(175)	23.2	(17.8, 28.7)	8.6	<0.005
≥ 31	(86)	33.3	(25.3, 41.3)		

¹⁾ numbers of valid responses

²⁾ 95% confidence interval

³⁾ test statistics for equality of survival distributions for the will to be self-reliant adjusted for each variable

⁴⁾ partially dependent on help

⁵⁾ dependent on help

Table 2 Hazard ratios for prognostic factors calculated from a multivariate analysis using Cox's proportional hazard model

Variable	Hazard ratio	(95%CI ¹⁾)	Significance p value
Sex (Male/Female)	2.15	(1.46, 3.16)	<0.0001
Age (years) ($\geq 80/65-79$)	1.02	(0.99, 1.05)	0.1470
Level of activities of daily living (low/high)	1.06	(0.98, 1.15)	0.1394
Refraining from expressing one's feelings (No/Yes)	1.02	(0.67, 1.54)	0.9342
Will to be self-reliant (weak/strong)	1.64	(1.05, 2.59)	<0.05
Period before the first visit (months) (< 31/ ≥ 31)	1.00	(0.99, 1.00)	<0.05

¹⁾ 95% confidence interval

Characteristics of the subjects were as follows: of the 274 elderly persons studied, 107 subjects (39.1%) were male and 167 (60.9%) female. At the first visit, those aged 80 or over accounted for 188 (68.6%). The main cause of their bedridden condition was stroke for 110 subjects (40.1%), senility for 51 (18.6%), rheumatism for 21 (7.7%), bone fracture for 20 (7.3%), heart disease for nine (3.3%), and cancer for nine (3.3%). In the case of cancer, the subjects were not notified of the nature of their disease. The period before the first visit was less than 31 months for 184 subjects (67.2%), and 142 subjects (51.8%) showed a low level of activities of daily living. The average period before the first visit was 25.5 months (SD=45.5) for a low level of activities of daily living, and 29.0 months (SD=44.9) for a high level. The subjects who lived with their families accounted for 265 peoples (96.7%), and the principal care-taker of the elderly was the spouse of 84 of the subjects (30.7%). As many as 268 subjects (97.8%) enjoyed help from their family, while 85 (31.0%) answered that they refrained from expressing their feelings. A total of 101 subjects (36.9%) expressed a strong will to be self-reliant.

Mean survival times for the classification groups are shown in Table 1, which also shows the factors related to the life prognosis in this study. Subjects who were female (survival time : 33.6 months) and aged 65-79 (survival time : 33.2 months), those with a high level of activities of daily living (survival time : 32.3 months), those who refrained from expressing their feelings (survival time : 34.1 months), or those whose period before the first visit was 31 months or more (survival time : 33.3 months) showed significantly longer mean survival time than others. Subjects with a strong will to be self-reliant also had a significantly longer mean survival time (37.6 months) than those with a weak will (21.0 months).

2. Hazard model analysis for prognostic factors

Hazard ratios which related significantly to mean survival time are shown in Table 2. Subjects who were male and those whose period before the first visit was less than 31 months showed significantly higher hazard ratios. Mortality hazard ratios for subjects with a weak will to be self-reliant to those with a strong will was 1.64, which was statistically significant. The

variables of age, level of activities of daily living and refraining from expressing one's feelings showed no significant differences.

3. Mean survival time in relation to the will to be self-reliant

A comparison of the mean survival times for the two groups classified according to the will to be self-reliant is shown in Table 3. As for the mean survival time for males, it was 46.7 months for the bedridden elderly with a strong will to be self-reliant and was 27.2 months for those with a weak will. As to other factors except for "no help from the family", the mean survival times were longer for the bedridden elderly with a strong will to be self-reliant than with a weak will. Test statistics for equality of survival times for the will to be self-reliant were significant for all the sub-classification groups except for high and low levels of activities of daily living, living without a family member, receiving no help from the family, having to refrain from expressing one's feelings and being alone in the daytime.

Table3 Comparison of mean survival time(months) for groups classified by the will to be self-reliant and sub-classified according to baseline data

Variable	Mean survival time (months)		Logrank test	
	Will to be self-reliant		Statistic ²⁾	p value
	Strong (95% CI ¹⁾)	Weak (95% CI ¹⁾)		
Sex				
Male	21.8 (13.7, 29.8)	11.9 (7.3, 16.6)	6.3	<0.05
Female	46.7 (33.1, 60.2)	27.2 (20.4, 34.0)	6.2	<0.05
Age (years)				
65-79	41.6 (28.6, 54.7)	25.2 (15.3, 35.0)	4.3	<0.05
≥ 80	32.9 (21.6, 44.2)	19.5 (14.4, 24.5)	3.5	0.0632
Level of activities of daily living				
High ³⁾	37.0 (27.6, 46.5)	25.5 (17.7, 33.3)	3.0	0.0816
Low ⁴⁾	34.6 (13.6, 55.6)	18.7 (13.1, 24.4)	2.0	0.1528
Number of family members				
1	42.0 (16.4, 25.9)	19.0 (5.1, 32.9)	1.5	0.2186
≥ 2	36.6 (27.0, 46.3)	21.1 (16.4, 25.9)	8.8	<0.005
Care-taker of the family				
Spouse	30.1 (18.0, 42.2)	15.6 (8.2, 23.1)	5.9	<0.05
Other	41.1 (28.4, 53.8)	23.4 (17.7, 29.1)	6.1	<0.05
Help from the family				
Yes	38.0 (28.2, 47.7)	20.4 (16.0, 24.8)	11.6	<0.001
No	2.0 (2.0, 2.0)	37.8 (0.0, 92.0)	0.2	0.6949
Refraining from expressing one's feelings				
Yes	41.5 (26.2, 56.8)	28.6 (18.1, 39.2)	1.6	0.2021
No	29.3 (21.0, 37.6)	14.8 (13.4, 23.3)	8.0	<0.005
Being alone in the daytime				
Yes	17.6 (6.7, 28.5)	13.1 (4.8, 21.4)	0.8	0.3715
No	38.5 (28.4, 48.6)	21.0 (16.3, 25.7)	10.5	<0.005
Period before the first visit (months)				
< 31	33.3 (22.9, 43.7)	17.9 (12.5, 23.3)	5.9	<0.05
≥ 31	45.0 (29.3, 60.6)	27.9 (19.0, 36.7)	4.3	<0.05

¹⁾ 95% confidence interval

²⁾ test statistics for equality of survival distributions for the will to be self-reliant adjusted for each variable

³⁾ partially dependent on help

⁴⁾ dependent on help

Table 4 Distribution of subjects by baseline data according to the will to be self-reliant for groups classified

Variable	Will to be self-reliant			Chi-square test p value
	Strong	Weak	Total	
Sex				
Male	41 (38.3%)	66 (61.7%)	107 (100.0%)	0.6162
Female	59 (35.3%)	108 (64.7%)	167 (100.0%)	
Age(years)				
65-79	41 (47.7%)	45 (52.3%)	86 (100.0%)	<0.01
≥ 80	59 (31.4%)	129 (68.6%)	188 (100.0%)	
Level of activities of daily living				
High ¹⁾	75 (56.4%)	58 (43.6%)	133 (100.0%)	<0.0001
Low ²⁾	25 (17.7%)	116 (82.3%)	141 (100.0%)	
Number of family members				
1	4 (44.4%)	5 (55.6%)	20 (100.0%)	0.6145
≥ 2	96 (36.2%)	169 (63.8%)	265 (100.0%)	
Care-taker of the elderly				
Spouse	35 (41.7%)	49 (58.3%)	84 (100.0%)	0.2273
Other	64 (34.0%)	124 (66.0%)	188 (100.0%)	
Help from the family				
Yes	98 (36.6%)	170 (63.4%)	268 (100.0%)	0.4452
No	1 (20.0%)	4 (80.0%)	5 (100.0%)	
Refraining from expressing one's feelings				
Yes	44 (52.4%)	40 (47.6%)	84 (100.0%)	<0.0005
No	56 (30.1%)	130 (69.9%)	186 (100.0%)	
Being alone in the daytime				
Yes	5 (35.7%)	9 (64.3%)	14 (100.0%)	0.9608
No	92 (36.4%)	161 (63.6%)	253 (100.0%)	
Period before the first visit(months)				
< 31	69 (37.5%)	115 (62.5%)	184 (100.0%)	0.6217
≥ 31	31 (34.4%)	59 (65.6%)	90 (100.0%)	

¹⁾ partially dependent on help

²⁾ dependent on help

4. Factors related to the will to be self-reliant

The distribution according to the will to be self-reliant for the classification groups is shown in Table 4. The sub-classification groups which showed a significantly high proportion of a strong will to be self-reliant were aged 65-79, and had a high level of activities of daily living and to have refraining from expressing one's feelings.

5. Discriminant analysis of the will to be self-reliant

For variables which showed a significant relationship as a result of the forementioned analyses, standardized canonical discriminant function coefficients for the will to be self-reliant are shown in Table 5. All variables were statistically significant, and the percentage of "grouped" cases correctly classified was 70.5%.

Discussion

Grand et al³⁾ and Donaldson and Jagger⁴⁾ reported that disability of the elderly is strongly related to their mortality. Grand et al⁵⁾ also reported that psychological factors such as a lack of plans for the future and a feeling of uselessness were strongly

Table 5 Standardized canonical discriminant function coefficients for the will to be self-reliant determined by discriminant analysis

Variable	Standardized canonical discriminant function coefficients	Univariate F-ratio	Significance p value
Age (0: 65-79, 1: ≥ 80)	0.165	6.22	<0.05
Level of activities of daily living (0: High, 1: Low)	0.857	51.24	<0.0001
Refraining from expressing one's feelings (0: Yes, 1: No)	0.344	12.80	<0.0005

Percentage of "grouped" cases correctly classified: 70.5%

related to mortality. Botwinick et al⁶⁾ showed that mortality of elderly people is correlated with risk markers such as mental deterioration. It can therefore be said that their mental state affects the mortality of the elderly. In Japan, Kuroda et al⁷⁾ showed that patients with Parkinson's disease tended to continue daily physical exercise when they were motivated. This, in turn, had a positive effect on survival rates among these patients. Warren and Knight⁹⁾ confirmed that increasing difficulties with self-care are associated with higher mortality.

From our study, we could understand that subjects with female, aged 65-79 or those with a high level of activities of daily living showed a significantly longer mean survival time than others. Subjects who refrained from expressing their feelings showed significantly longer mean survival time than others. The elderly people who pay attention to their family's feelings may try to do as much as possible by themselves so as not to be a problem to other family members. Also subjects with a strong will to be self-reliant were significantly longer mean survival time than others. The elderly people who have a strong will to be self-reliant also may make efforts to do as much as possible by themselves. These attitude may make their live longer.

Subjects with a period of less than 31 months from the time they became bedridden until the first visit were significantly shorter mean survival time than another. This suggests the families of bedridden elderly often do not call on a public health nurse for aid until the condition of the elderly has become serious. In fact, the mean period before the first visit was 25.5 months for subjects with a low level of activities of daily living and 29.0 months for those with a high level of one.

In this study of Cox's proportional hazard model, the will to be self-reliant was shown to be one of the factors related to life prognosis. The will to be self-reliant affects the ability for self-care which in turn affects mortality.

On factors affecting the will to be self-reliant, the chi-square tests and discriminant analysis used in this study showed that it is significantly related to age and level of activities of daily living. As for age, people generally do not expect much from the elderly as they grow older, so the elderly come to feel of uselessness. This situation leads to a loss of the will to be self-reliant. As for activities of daily living, Aso et al¹⁰⁾ reported that bedridden elderly with a strong will to be self-reliant were significantly better off than those with a weak will in terms of maintaining or increasing their activities of daily living. About the will to be self-

reliant, Kondo¹¹⁾ explained that a life worth living influenced the level of activities of daily living. Nakanishi¹²⁾¹³⁾ reported that elderly people who considered that their lives were worth living had maintained their level of activities of daily living. As Fries¹⁴⁾ has stated, to increase the physical, emotional, and intellectual vigor of the elderly until shortly before death should be emphasized in order to promote an active life. Bradbury and Catanzaro¹⁵⁾ as well as Burckhardt¹⁶⁾ showed that persons who believe that their health is relatively good (even if objectively their health is poor) tend to be highly satisfied with their lives. Tatara et al¹⁷⁾ discussed the need for home care services in terms of not only physical care but also for the mental well-being of the elderly.

As for factors affecting the will to be self-reliant which were related to the situation in the family, refraining from expressing one's feelings was selected as a significant factor¹⁸⁾. The elderly people who pay attention to their family's feelings may be more

conscious of being independent, and this consciousness affects the will to be self-reliant.

Many Japanese elderly live together with their children and if the elderly are sick, their families often take care of them for 24 hours a day. This situation can easily lead to making the elderly become dependent on their families. On the other hand, as for social participation, the proportion of elderly people who joined in group activities was about 60% in the United States and Germany, 53% in England and only 15% in Japan. These findings paint a picture of Japanese elderly people with an introverted life, which may foster feelings of uselessness and in turn may lead to a loss of the will to be self-reliant. To conclude, the analysis presented in this study points out the need for home care services in Japan to work in cooperation with families to emphasize encouragement for the elderly to strengthen their will to be self-reliant.

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